
The Town of Wellesley Energy Reduction Plan

Prepared by the Wellesley Sustainable Energy Committee

with support from the:

Facilities Management Department, Municipal Light Plant,
Department of Public Works,
Board of Selectmen, and School Committee



In fulfillment of the
Massachusetts Green Communities Designation and Grant Program

Criterion 3

December 2017

(Revision of November 2017 ERP)

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Purpose and Acknowledgments

The Town of Wellesley has completed and adopted this Energy Reduction Plan (ERP) for submission to the Massachusetts Department of Energy Resources (DOER) in fulfillment of Criteria 3 of the requirements for Green Community designation.

This ERP identifies opportunities for energy reduction and sets a timeline for implementing energy conservation projects that will enable the municipality to reduce total energy use by 20% over a five-year period. Energy conservation has been a priority for the Town of Wellesley for over a decade and this Energy Reduction Plan is part of an ongoing series of initiatives aimed at reducing the Town's carbon footprint and promoting sustainability, more generally. Town Departments, especially the Facilities Management Department (FMD), Municipal Light Plant (MLP), and Department of Public Works (DPW) have a long history of energy conservation and their contributions to the ERP attest to their continued commitment to reducing greenhouse gas (GHG) emissions, protecting the environment, safeguarding human health, and conserving financial resources.

Appendix E contains letters from Wellesley's Board of Selectmen and School Committee confirming their endorsement of the Plan.

The ERP benefitted from the collaborative efforts of many individuals and groups including:

- Board of Selectmen
- Dave Cohen, DPW Assistant Director
- Trevor Criswell, MLP Energy Services and Planning Manager
- Richard DeLorie, Fire Department Chief
- Katy Gibson, Member, Sustainable Energy Committee and Municipal Light Board
- Tim Gover, Wellesley Police Department Officer
- Allen Hebert, FMD Operations Manager
- Debra Healy, MLP Assistant Director
- Matthew Hornung, Sustainable Energy Committee Intern
- Meghan Jop, Town Assistant Executive Director
- Dick Joyce, MLP Director
- Ellen Korpi, Sustainable Energy Committee Vice Chair
- Regina LaRocque, Natural Resources Commissioner
- Suzanne Littlefield, Permanent Building Committee
- Marybeth Martello, Sustainable Energy Administrator
- Joe McDonough, FMD Director
- Deane McGoldrick, Wellesley Public Schools Transportation Coordinator
- Raina McManus, Natural Resources Commissioner
- Suzanne Newark, MLP Office Manager
- Laura Olton, Sustainable Energy Committee Chair
- Jeffrey Peterson, Fire Department Assistant Chief
- Chief Jack Pilecki, Chief of Police
- Mike Pakstis, DPW Director

- Blythe Robinson, Town Executive Director
- School Committee
- Douglas Stewart, Assistant Town Engineer
- Lieutenant Scott Whitemore, Police Department

The Town of Wellesley would also like to thank our Department of Energy Resources Regional Coordinators, Joanne Bissetta (now Deputy Director of the Green Communities Division) and Neal Duffy, for their guidance regarding the ERP and Wellesley's Green Communities application process, in general. The Town is similarly grateful to Sam Gechter and John Snell for their technical support regarding MassEnergyInsight software.

Executive Summary

About the Town of Wellesley

Wellesley is a town in Norfolk County, Massachusetts. The Town was incorporated in 1881 and covers an area of 10.35 square miles. According to the Federal Census, Wellesley's population as of January 1, 2010, was 27,982. Wellesley is the home to Wellesley College, Babson College, Massachusetts Bay Community College, and a number of retail establishments and other businesses. Town government includes a Board of Selectman and is run by Town Meeting. The Wellesley MLP is responsible for the distribution of electricity to the municipality and to residences and businesses in the wider Wellesley community. The FMD manages most of the Town's buildings. The DPW oversees the Town's drinking water, wastewater, and recycling and disposal facilities and operations, in addition to managing the Town's parks, roads, and other, engineering-related matters.

Wellesley and its Long-standing Commitment to Sustainable Energy Use

Recognizing the importance of developing and adopting locally-sustainable practices to reduce energy use and the impacts of GHG emissions, the 2008 Town Meeting commissioned the Green Ribbon Study Committee to develop a Sustainable Energy Plan for the Town that identifies policies and actions that will increase energy conservation and efficiency, reduce reliance on fossil fuels, and reduce GHG emissions, at both public and private levels. Based on the Committee's preliminary work, the 2009 Town Meeting set a goal to reduce emissions to 10% below 2007 levels by 2013. Town Meeting established the Sustainable Energy Committee (SEC) in 2010 and an SEC Coordinator staff position (now the Sustainable Energy Administrator), to lead efforts to accomplish the goal adopted at the 2009 Annual Town Meeting, to monitor and report progress toward that goal, and to propose further goals for emissions reductions to Town Meeting. The 2014 Annual Town Meeting adopted the SEC proposal to establish a new goal to reduce Town-wide emissions 25% below 2007 by 2020. Figure 1 shows town-wide (*municipal and community*) progress toward reducing greenhouse gas emissions in metric tons for FY16, FY15, and FY07. Between 2007 and 2016, building-related Town-wide, non-normalized¹ emissions decreased by 19% and Town-wide, non-normalized, total emissions decreased by about 13%.

¹ "Normalized" energy use correlates metered energy use to heating degree and cooling degree days. Metered energy use is simply the energy use (kWh or therms) as reported by the meters.

Figure 1: Wellesley Town-wide Greenhouse Gas Emissions (metric tons)

Greenhouse Gas Emissions (eCO ₂) in metric tons						
				2015 - 2016		2007 - 2016
	Share of Total	2016	2015	Percent	2007	Percent
Electricity/Natural	2016 Emissions	Emissions	Emissions	Change	Emissions	Change
Gas/Fuel Oil						
Residential	29.7%	105,879	112,341	-5.8%	132,862	-20.3%
Commercial	13.3%	47,406	48,457	-2.2%	57,922	-18.2%
Colleges	10.9%	38,970	39,250	-0.7%	45,886	-15.1%
Municipal	2.0%	6,994	7,816	-10.5%	9,287	-24.7%
Building Subtotal	56.0%	199,248	207,863	-4.1%	245,957	-19.0%
Waste	0.5%	1,853	1,756	5.5%	2,027	-8.6%
Gas/Diesel	43.5%	155,001	153,502	-0.3%	160,468	-3.4%
Total Emissions	100.0%	356,102	365,121	-2.5%	408,452	-12.8%

Municipal energy use contributes approximately 3% (2% from municipal buildings and 1% from waste and the municipal vehicle fleet) to the combined municipal and community-wide total energy use. The FMD, MLP, SEC, Natural Resources Commission (NRC), and 3R (Reduce, Reuse, Recycle) Working Group are Town department and government entities that have carried out energy use and GHG emissions reduction efforts. Over the past seven to eleven years these groups have launched a number of initiatives aimed at reducing the Town's energy consumption and increasing reliance on renewable forms of energy.

Facilities Management Department and Energy Conservation

As of July 1, 2016, the Facilities Management Department manages all Town buildings except for water/sewer buildings and those belonging to the MLP. The FMD has been reducing building energy use since the Department's establishment in 2012 and with the hire of a full-time energy manager. Between fiscal years 2012 and 2016, FMD reduced total, weather-normalized energy use by 8% (based on a 4% reduction in electricity use and an 8% reduction in natural gas use). This reduction corresponds to an annual cost avoidance of \$108,000. FMD energy conservation projects have included: installation of light emitting diode (LED) lights, recommissioning of heating ventilation and air conditioning (HVAC) systems, Town-wide installation of direct digital controls for HVAC systems (Metasys), mechanical engineering studies, and equipment audits.

FMD's management practices support energy efficiency, as the Department tracks and analyzes building-specific electricity and natural gas use. Weather-normalized data allows the identification of energy use anomalies and the development of cost-effective solutions where these anomalies indicate the need for equipment repair or replacement. FMD uses Metasys, a building automation system, which allows monitoring and control of HVAC, lighting, and alarm systems. A commitment to preventive maintenance further supports FMD's effort to conserve energy. FMD manages approximately 5,000

pieces of HVAC equipment and 50,000 Metasys data points. Preventative maintenance (managed via cloud-based operations management software), allows FMD to optimize the efficiency of its equipment, extend equipment life, and reduce operating costs.

Municipal Light Plant and Energy Conservation

Wellesley's MLP has been a leader in energy conservation since 2007, supporting the creation of the SEC and providing half the funding for the SEC Administrator. The MLP and SEC have worked together on campaigns to promote participation in a program in which residents voluntarily purchase renewable energy (achieving the participation of 11 percent of households); to conduct home energy audits; and to install residential solar. The MLP offers free energy audits for homes heated with fuel oil and rebates on energy efficient appliance purchases. In addition to providing financial incentives during the solar campaign, the MLP provides generous help during the installation process and a net metering policy that credits the homeowner at the residential rate for energy returned to the grid. The MLP has funded energy efficiency initiatives for other Town departments and the retrofit of Town streetlights to LED. The bulk of the streetlight conversions will occur in FY2017, with support from a DOER grant. The MLP has also partnered with the FMD on a number of energy conservation measure projects, including LED lighting and Metasys upgrades, under the Green Communities Act (MGL 25A, Section 14). Since 2007, the MLP has reduced carbon emissions from its Wellesley buildings and substations by 59% and from the Town's streetlight by 33%. The MLP is a 100% participant in the voluntary renewable energy program. Figure 2 describes many MLP initiatives.

Figure 2: MLP Energy Conservation Measures 2006-2017	
2006-7	Installed compact fluorescent lighting retrofits at Hardy School, Town Hall, Hunnewell School, and Fire Station Headquarters
2007	Retained energy efficiency expert Alan Mulak to conduct two seminars for municipal and commercial customers
	Replaced RDF motors and infra-red heaters. Installed retrofit incandescent and metal halide lighting
	Offered demand side management to ten municipal buildings/facilities; three participated
2008	Sponsored/participated in "Power of One" presentation on conservation methods; extended invitation to all municipal departments
	Replaced the inverter to re-activate Wellesley High School (WHS) solar panels and provide real-time data
	Approved funding for energy efficiency modeling at WHS, occupant sensors at the Police Station, and retrofit of the Main Library parking garage lights
	On the recommendation of the Green Ribbon Study Committee, altered municipal utility bill to promote conservation by providing 13 months of usage on the bill
2009	Established "Grounded Power" program at the Town Hall, Main Library, and Middle School
	Initiated "Power Down" event at Town Hall – all electricity (except elevator) shut off, then turned on in sequence to identify high consumption uses
	Replaced all mercury vapor and metal halide streetlights with high pressure sodium
	Replaced Central Street ornamental streetlights with LED fixtures
2010	Committed to funding one half of the Sustainable Energy Administrator position
	Retrofitted 105 ornamental streetlights with LED fixtures
	Removed old WHS solar panels and installed as a ground-mounted array at the MLP
	Awarded 50kW solar installation on the MLP garage

	MLP, BOS, NRC, and Library sponsored “Sustainable Energy Day” for municipal and commercial accounts to communicate 10% reduction goal
	Funded commercial grade energy audit of Town Hall and Middle School
2011	Retained solar consultant, Richard Chase, to provide guidance to municipal departments and non-profits
	Funded analysis to justify conversion of Middle School from oil to natural gas
	Sponsored “Wellesley Green Classroom” certification program
	Performed LED retrofit of 403 remaining ornamental streetlights
	Agreed to fund 40kW High School solar installation
	Initiated “Summer Cooling” campaign with the Sustainable Energy Committee and Sustainable Wellesley
2012	Funded Energy Miser installation at the Warren Building
	Achieved 10% enrollment in Power to Choose voluntary renewable program and participation at 5% for all municipal electricity accounts, earning a Green Power Community designation
	Enrolled MLP in voluntary renewable program at 100%
2013	Partnered with FMD to retrofit parking lot lights at Bates and Sprague Schools
	Adopted and promoted “LESS” (lights, equipment, supplies, and seasonal) conservation Program to all Town departments
	Supported Power to Save home energy audit program
2014	Authorized LED conversion of 125 Route 9 streetlights
	Provided incentive for residential solar installations through More Power to Choose program
2015	Agreed to fund one half of the Sustainable Energy Administrator position
2015/16	Provided fiber connectivity to FMD and other Town buildings to monitor and control energy usage
	Developed legal framework to facilitate the installation of solar on non-profits
2016	Established preliminary Wellesley College and municipal load shedding program with Tangent
2016/17	Made preparations and secured/approved funding for LED retrofit for 3,111 streetlights

The SEC, NRC, 3R Working Group, and Energy Conservation

SEC programs have focused on energy use reduction in both the municipality and the community at large. The SEC works with Town departments, committees, and boards; Wellesley Public Schools; activist organizations such as Sustainable Wellesley and Wellesley Green Schools; and state and federal government agencies. Each year the SEC, together with the MLP, calculates the Town’s greenhouse gas GHG emissions and compares these emissions to those of previous years. Wellesley’s emissions, also known as its “carbon footprint,” are calculated from a mix of actual and estimated inputs regarding the use of electricity, natural gas, propane, heating oil, gasoline, and diesel fuel by municipal entities, colleges, households, and businesses.

The SEC’s programs also involve significant participation by other groups with common goals. To connect numerous, environmentally-interested groups across Town, the SEC facilitates Wellesley’s Green Collaborative. The Collaborative consists of nearly 30 entities including grassroots, climate-action groups, houses of faith, land conservation activists, civic organizations, and garden clubs. The Collaborative meets several times per year to discuss sustainability issues relevant to Wellesley and to hear from a variety of speakers.

Working closely with municipal departments, the SEC has coordinated the preparation of Wellesley’s Green Communities application. Other SEC initiatives include:

- Analysis of municipal and community energy use and the Town's carbon footprint (with the MLP);
- Initiation and achievement of the Town's Stretch Building Code;
- Power to Choose initiative, with the MLP, which increased participation in the voluntary renewable energy program to more than 10 percent;
- Power to Save Program with the MLP, which achieved 450 home energy audits;
- More Power to Choose program with MLP;
- Participation in an MLP initiative to develop a legal framework for installation of solar systems for non-profits;
- WasteWise Wellesley (in partnership with the 3R Working Group) a Town-wide program designed to identify and capitalize on win-win opportunities associated with sustainable materials management (SMM). WasteWise Wellesley programs include recycling, food recovery, food rescue (for distribution to food-insecure individuals and families) at academic institutions throughout the Wellesley area, Repair Café, and a food waste recovery pilot at Wellesley's Recycling and Disposal Facility.
- Promotion of Sustainable Development Guidelines to guide the development of sustainable, energy-efficiency building projects via engagement with the Permanent Building Committee, FMD, Wellesley Public Schools, and with the Town's Hardy, Hunnewell, Upham effort to plan new schools
- Leadership and management of Wellesley's Green Communities Designation Application process

The NRC has done important work toward identifying and addressing the more than 200 gas leaks in Wellesley. The NRC has also researched and communicated with Town departments and boards on the topic of exterior lighting and its implications for energy consumption, and human and environmental health. On September 26, 2017 the NRC hosted lighting expert, Bob Parks, who delivered talks to Town departments and the Wellesley community.

Summary of Municipal Energy Uses

Buildings

Wellesley had 27 buildings in FY2015. These buildings include a Town Hall, ten schools (one preschool, seven elementary, one middle, and one high school), a field house, three libraries, a recreation building, two fire stations, a police building, and facilities for the MLP, DPW, recycling/disposal operations, and Morses Pond.

In FY15, natural gas provided heating to all buildings except for the MLP Headquarters, the Fells Library, the Morses Pond Bath House, and the Recycling and Disposal Facility (RDF). The Fells Library was converted from oil to natural gas heat in FY16. The MLP derives heat from electricity and from a wood stove. Condemned Town trees provide the wood for MLP's wood stove, which uses about three cords per year. Since the Morses Pond Bath House operates during summer months, it uses only electricity. The RDF has electric heat. The High School has a geothermal system that provides energy to some of the school's administrative offices.

The MLP and High School also have solar photovoltaic arrays that supply a portion of their electricity. The High School has a roof-mounted solar array. The MLP has one ground-mounted and one roof-mounted solar array.

The Sprague Field House, although a single structure, is considered two distinct buildings for energy accounting purposes. These buildings appear in Tables 3a and 3b as “Sprague Field House – Large” and “Sprague FH – Park & Tree.” The field house contains several garage bays. All but one of these bays belong to the Facilities Management Department (FMD). The remaining bay (Park & Tree) belongs to the Department of Public Works (DPW).

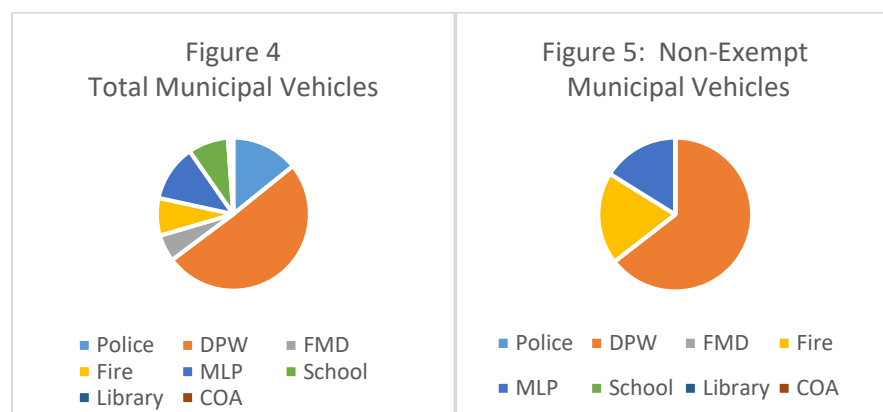
The building listed as “900 Worcester” refers to the site of the former St. James Church and Rectory. Two electric accounts were active for this property from November 14 through mid-August 2015 during site analysis and building demolition. Wellesley has since leased this property to a private developer who will build and operate a sports facility on the site.

The Town just recently (Fall 2017) opened the Tolles-Parsons Center, a building that serves Wellesley’s Council on Aging (COA) and the community’s seniors. Tolles-Parsons constitutes a building stock change in the FY16-FY20 ERP time period.

Vehicles

The Town of Wellesley owns 176 vehicles, as defined by the Department of Energy Resources. Vehicle ownership, by department, appears in Figures 3, 4 and 5. The DPW owns the largest number of vehicles (89), with the remaining vehicles belonging to the MLP, Police Department, Fire Department, FMD, Schools, Library, and COA. Non-exempt vehicles are subject to the Fuel Efficient Vehicle Policy (FEVP) that Wellesley is submitting to fulfill the Criterion 4 requirement of its Green Communities application. As of November 30, 2017, Wellesley owned 31 non-exempt vehicles and 145 exempt vehicles. Most of the non-exempt vehicles belong to DPW (20 vehicles), followed by the Fire Department (6 vehicles), and the MLP (5 vehicles). Of the current non-exempt vehicles, seven are hybrid vehicles (Prius cars), one owned by the MLP and the other six owned by the DPW. The MLP has plans to buy the Town’s first plug-in vehicle.

Figure 3: Vehicle Inventory as of November. 30, 2017					
Sector	Number of Vehicles	Percentage of Total Vehicles per Department	Exempt Vehicles	Non-Exempt Vehicles	Percentage of Non-exempt Vehicles per Department
Police	25	14	25	0	0
DPW	89	51	69	20	65
FMD	10	6	10	0	0
Fire	14	8	8	6	19
MLP	21	12	16	5	16
School	15	9	15	0	0
Library	1	1	1	0	0
COA	1	1	1	0	0
Total	176	100	145	31	100



Water and Wastewater

The Department of Public Works manages Wellesley's water and wastewater systems. Drinking water comes primarily from Town wells. As listed in Table A-11 in Appendix A, equipment includes three drinking water treatment plants, two drinking water pump stations, and ten well water pumps. Wellesley has two wastewater pump stations, and nine ejectors.

Streetlights and Traffic Lights

Wellesley's streetlights total 3,744. There are 19 traffic lights, and 20 "other lights" including athletic field, tennis court, and speed control lights.

Table 1 provides a summary of the abovementioned municipal energy users.

Table 1: Summary of Municipal Energy Users in FY15

	Number	Ownership
Buildings		
Oil Heat	1	Municipality
Natural Gas Heat	22	Municipality
Biomass Heat	1	Municipality
Electric Heat	3	Municipality
Geothermal Heat	1	Municipality
Vehicles		
Non-Exempt	31	Municipality
Exempt	145	Municipality
Street Lights	3,744	Municipality
Traffic Lights	19	Municipality
Other Lights	20	Municipality
Substations	3	Municipality
Water and Sewer		
Drinking Water Treatment Plants	3	Municipality
Wastewater Treatment Plants	0	Municipality
Pumping Stations	4	Municipality
Ejectors	9	
Buildings Eliminated before FY2020: 900 Worcester Street*	1	Municipality
New Buildings Planned before FY2020: Tolles- Parsons Senior Center	1	Municipality

*The 900 Worcester Street site had two active electric accounts from November 2014 through August 2015.

Summary of Energy Use Baseline and Plans for Reductions

Table 2 provides a summary of Wellesley's FY15 energy use baseline and plans for reductions.

Table 2: Summary of Energy Use Baseline and Plans for Reduction

BASELINE YEAR FY2015	MMBtu Used in Baseline Year	% of Total MMBtu Baseline Energy Consumption	Projected Planned MMBtu Savings	Savings as % of Total MMBtu Baseline Energy Consumption
Buildings	93,932	70	12,375	9.3%
Vehicles	23,644	18	3,722	2.8%
Street/Traffic Lights	6,878	5	4,078	3.1%
Water/Sewer/Pumping	8,202	6		
Substations	860	1		
Total	133,516	100%	20,175	15%

Energy Use Baseline Inventory

Inventory Tool Used

Wellesley is using MassEnergyInsight as its Green Communities inventory tool. Wellesley uses ICLEI-Local Governments for Sustainability software, ClearPath, to record municipal and community energy use and greenhouse gas emissions. Greenhouse gas emissions data dates back to 2007.

Baseline Year

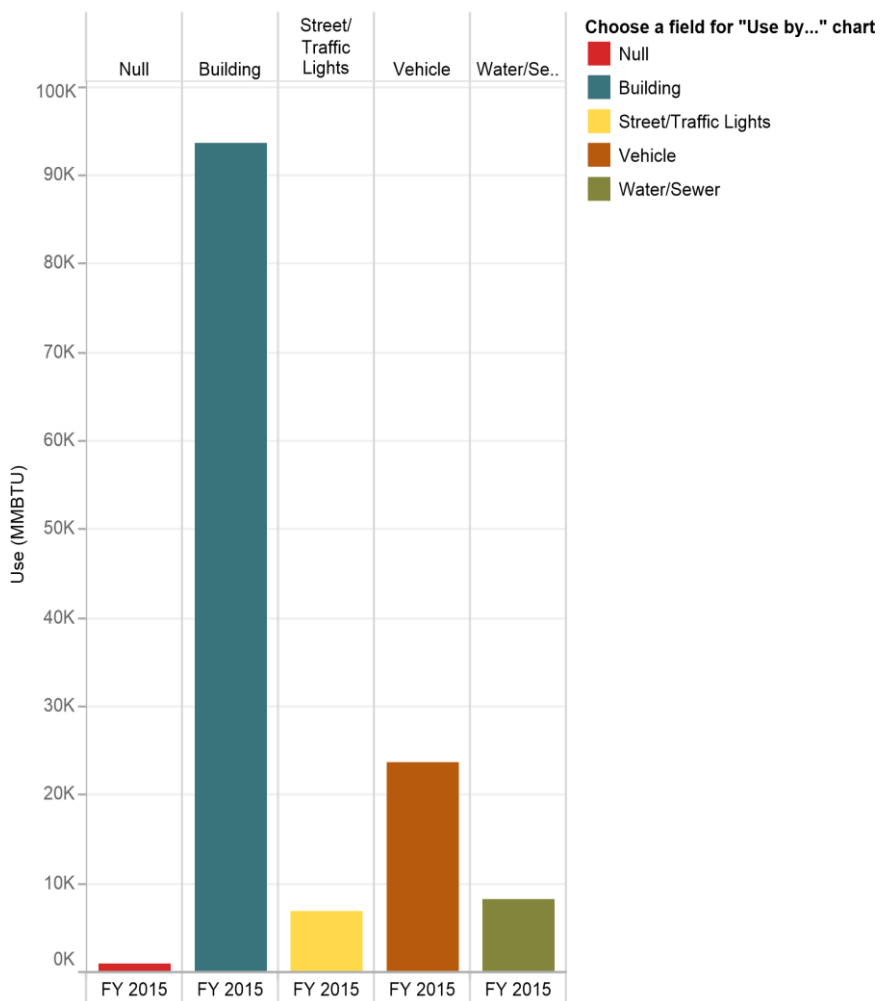
Wellesley has selected fiscal year 2015 (FY15) as its baseline year. Given that Wellesley is submitting its Green Communities application in October 2017, FY15 is the earliest year that Wellesley is permitted to use as a baseline. Going back further in time would enable Wellesley to more easily show a 20% reduction over a five-year period. For many communities the ERP offers a chance to identify and take action on the "low-hanging fruit" of energy conservation measures (ECMs). In Wellesley, however, the Town has already picked much of this low-hanging fruit. As discussed above, our Town departments and government have been highly proactive in seeking out and realizing opportunities for reducing the Town's energy use. Choosing FY15 as the baseline year, however, does allow Wellesley to include important ECMs implemented in FY16 and FY17.

Municipal Energy Consumption for the Baseline Year

Figure 6 provides a graphical illustration of energy use by sector. Buildings are the largest municipal users of energy, representing about 70% of total energy consumption followed by vehicles (18%); pumps, pumping stations, boosters, ejectors and water treatment plants (6%); street, traffic, field, and other lights (5%); and substations (1%). Municipal energy use in FY15 totaled 133,516 MMBtus.

Figure 6: Energy Use by Facility

Note: "Null" refers to substations



Tables 3a and 3b show the Town's energy use during its baseline year of FY15 in native units and MMBtus, respectively. The five-year timeframe for the 20% energy reduction is FY2016-FY2020.

ERP Guidance Table 3a - Municipal Energy Consumption for FY15 (Native Fuel Units)

ERP Guidance Table 3a - Municipal		Electric (kWh)	Gas (therms)	Gasoline (gallons)	Diesel (gallons)	Propane (gallons)/ Heating Oil (gallons)	Solar Electric (kWh)	Wood (cords) Geothermal (MMBtu)*
Null	#1 Municipal Way - Old Subst..	3,691	873					
	#8 Mun Way Station 41 - MLP..	124,280						
	Weston Road Substation-2500	98,571						
	Total	226,542	873					
Building	Fire Station - Central St.	37,982	4,993					
	Wellesley MS	1,253,880	165,858					
	Hunnewell Elementary	153,467	49,115					
	Fiske Elementary	253,960	38,936					
	Hills Branch Library	12,685	3,023					
	Wellesley Town Hall	273,720	13,088					
	Wellesley Free Library	905,760	18,951					
	Bates Elementary	309,480	47,282					
	Hardy Elementary	185,280	32,979					
	Fire Station HQ	177,000	18,204					
	Upham Elementary	187,240	24,785					
	#30 Municipal Way Highway	593,800	25,476					
	Schofield Elementary	372,800	30,477					
	MLP/DPW Administration	3,040	11					
	PAWS Preschool	56,080	4,326					
	Warren Recreation Bldg.	277,200	12,107					
	Recycling and Disposal Facility	264,880						
	Fells Branch Library	9,333				266		
	Sprague Elementary	612,000	36,783					
	Police Station	401,440	6,738					
	Wellesley WHS	2,320,000	71,282				37,589	356
	Sprague Field House - Large	21,094	4,761					
	Sprague FH - Park & Tree	774	2,176					
	#20 Municipal Way Water Buil..	12,810	13,886					
	#4 Municipal Way - New MLP ..	295,280					31,340	3
	900 Worcester Street establis..	2,687						
	Morses Pond Bath House	9,870						
	Total	9,003,542	625,237				68,929	356 MMBtu 3 Cords
Street/Traffic Lights	Street Lights	1,879,505						
	Traffic Lights	69,711						
	Other Lights	66,736						
	Total	2,015,952						
Vehicle	Diesel				63,835			
	Unleaded Gasoline			119,119				
	Total			119,119	63,835			

Water/Sewer	Morses WTP	863,040				2,846		
	Longfellow Pump Station (104..	303,120				2,571		
	Wellesley Avenue WTP (1040..	612,000				3,259		
	Water Treatment Pumps and ..	214,767						
	Sewer Ejectors and Treatment	179,417						
	Total	2,172,344				8,676/266		
Grand Total		13,418,380	626,110	119,119	63,835	8,676/266	68,929	356 MMBtu 3 Cords

The Wood/Geothermal column lists values for wood used at the MLP (in units of cords) and geothermal energy used at WHS (in units of MMBtu). The FY15 geothermal energy use at WHS is conservatively estimated to equal five percent of the WHS FY15 natural gas use (5% of 7128 MMBtu or 356 MMBtu).

ERP Guidance Table 3b – Municipal Energy Consumption for 2015 (MMBtu)

		2015							Total
		Diesel	Electric	Gas	Gasoline	Propane/ Heating Oil	Solar Electric	Wood/* Geothermal	
Null	#1 Municipal Way - Old Subst..		13	87					100
	#8 Mun Way Station 41 - MLP..		424						424
	Weston Road Substation-2500		336						336
	Total		773	87					860
Building	Fire Station - Central St.		130	499					629
	Wellesley MS		4,278	16,586					20,864
	Hunnewell Elementary		524	4,912					5,435
	Fiske Elementary		867	3,894					4,760
	Hills Branch Library		43	302					346
	Wellesley Town Hall		934	1,309					2,243
	Wellesley Free Library		3,090	1,895					4,986
	Bates Elementary		1,056	4,728					5,784
	Hardy Elementary		632	3,298					3,930
	Fire Station HQ		604	1,820					2,424
	Upham Elementary		639	2,479					3,117
	#30 Municipal Way Highway		2,026	2,548					4,574
	Schofield Elementary		1,272	3,048					4,320
	MLP/DPW Administration		10	1					11
	PAWS Preschool		191	433					624
	Warren Recreation Bldg.		946	1,211					2,157
	Recycling and Disposal Facility		904						904
	Fells Branch Library		32			37 (heating oil)			69
	Sprague Elementary		2,088	3,678					5,766

	Police Station		1,370	674					2,044
	Wellesley WHS		7,916	7,128			128	356	15,528
	Sprague Field House - Large		72	476					548
	Sprague FH - Park & Tree		3	218					220
	#20 Municipal Way Water Buil..		44	1,389					1,432
	#4 Municipal Way - New MLP ..		1,007				107	60	1,174
	900 Worcester Street establis..		9						9
	Morses Pond Bath House		34						34
	Total		30,720	62,524		37 (oil)	235	416	93,932
Street/Traffic Lights	Street Lights		6,413						6,413
	Traffic Lights		238						238
	Other Lights		228						228
	Total		6,878						6,878
Vehicle	Diesel	8,873							8,873
	Unleaded Gasoline				14,771				14,771
	Total	8,873			14,771				23,644
Water/Sewer	Morses WTP		2,945			259			3,204
	Longfellow WTP (104..		1,034			234			1,268
	Wellesley Avenue WTP (1040..		2,088			297			2,385
Water/Sewer	Water Treatment Pumps and ..		733						733
	Sewer Ejectors and Treatment		612						612
	Total		7,412			790			8,202
Grand Total		8,873	45,783	62,611	14,771	827	235	416	133,516

*The Wood/Geothermal column lists values for wood used at the MLP and geothermal energy used at WHS in units of MMBtu. The FY15 geothermal energy use at WHS is conservatively estimated to equal five percent of the WHS FY15 natural gas use (5% of 7128 MMBtu or 356 MMBtu).

Energy Reduction Plan

Narrative Summary

The ECMs presented in this plan are part of on-going efforts to reduce the Town of Wellesley's municipal energy use. The ECMs described below, listed in Table 4 and documented in Appendix A, focus on buildings, streetlights, and vehicles, with the last two years building nicely on the work planned for years one through three.

Overview of Goals for Years 1-3

- Recommission the heating, ventilation and air conditioning systems at Central Street Fire Station, Fire Station Headquarters, High School, Main Library, the Police Station, Town Hall, and the Warren Building.
- Install Metasys at Bates, Fiske, Central Street Fire Station, Main Street Fire Station, Wellesley High School, Fells Library, Hills Library, Main Library, Middle School, PAWS Preschool, Police Station, Schofield, Warren Building,

- Replace windows and doors at the Middle School.
- Replace interior fluorescent lights with LED lights in Bates School, Fiske School, Central Street Fire Station, Fire Station Headquarters, Main Library, Preschool at Wellesley Schools (PAWS), Wellesley High School, Schofield School, Sprague School, Town Hall and the Warren Building.
- Retrofit 3,111 high pressure sodium street lights with LED lights.
- Purchase one piece of IdleRight equipment for a Police Department pilot study.
- Pilot FuelMaster at the DPW to test its efficacy.
- Develop a plan to increase the number of electric vehicles in the Town's fleet.

Overview of Goals for Years 4-5

- Replace additional fluorescent lights in Bates School, Central Street Fire Station, Fire Station Headquarters, Fells Library, High School, Hills Library, Main Library, Middle School, Police Station, Sprague, and the Warren Building.
- Add wireless controls to street lights and implement a dimming scenario that saves energy and money.
- Install IdleRight in 25 police cruisers, if the Police Department deems this advantageous based on the pilot in years 1-3.
- Establish a municipal anti-idling policy for all departments outside of the Police Department.
- Utilize FuelMaster in a large number of municipal vehicles if the pilot proves successful.
- Implement the Fuel Efficient Vehicle Policy and increase the number of electric vehicles in the Town's fleet.

Areas of Least Efficiency/Greatest Waste

Buildings – The set of illustrations labeled Figure 7, rank buildings by their energy use per square foot. The Park and Tree section of the Field House (the least efficient building) is quite small and the Town will examine its energy use more closely. The highway building at 30 Municipal Way ranks as the second in the list of least efficient buildings. HVAC recommissioning (although it is not listed in Table 4) is, in fact, planned for the Highway Building in FY19. Fiske and Hunnewell are two of Wellesley’s older schools and Hunnewell will be replaced as part of the Town’s Hardy, Hunnewell, Upham Project. FMD recently installed Metasys in Fiske School. Overall, the Town will continue to use MEI to examine and improve the relative energy efficiency of its various buildings.

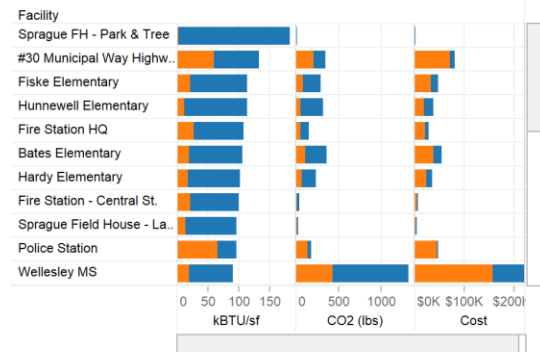
Figure 7: Buildings to Target

Buildings to Target

This dashboard compares buildings to one other on an energy use per area metric, measured as kBTU/square foot. In the quadrant chart on the right, buildings with the highest energy use and worst efficiency (as compared to other buildings in your portfolio) are in the upper right hand quadrant. Facilities of the types Open Space, Water/Sewer, Street/Traffic Lights, and Vehicles are not displayed. Diesel and Gasoline records attached to a building are not included in the kBTU/SF calculation.

Building Efficiency, Emissions and Cost

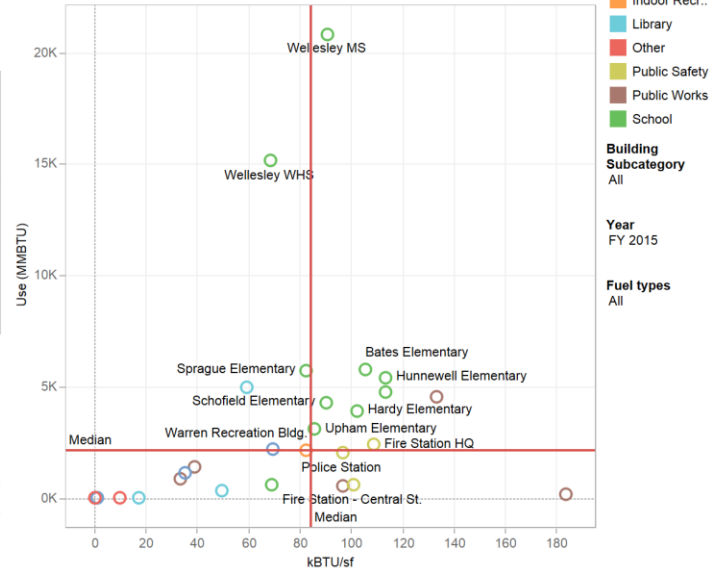
Heating Electric
Emissions factors updated 1/4/2012 using Massachusetts-specific greenhouse gas emissions factors.



Select a building name above to see how efficient it is compared to your other buildings. Lower numbers indicate greater efficiency.



Efficiency and Use



Lights – The MLP and FMD have pro-actively sought out opportunities to reduce energy use with new lighting technology. LED retrofits, for both interior and exterior lighting, are an important part of our planned energy conservation measures.

Vehicles – The size, composition, and energy use of Wellesley’s vehicle fleet are probably comparable to those in similar communities. Whereas, energy use in Wellesley’s buildings has decreased significantly since 2012, unleaded gasoline use increased by 3% between 2007 and 2016 and diesel increased by 1% during that same period. Increasing the energy efficiency of these vehicles wherever possible (including increased reliance on electric vehicles), elimination of unnecessary driving, reductions in idling and other measures promises to reduce the sizeable amount of energy that vehicle use contributes to the Town’s overall energy use.

Getting to 20% Energy Use Reduction in Five Years

The ECMs listed in Figure 8 are projected to decrease Wellesley's annual energy use by 15% below the FY15 baseline. Additional energy saving measures involving buildings, vehicles, water, and wastewater will allow the Town to achieve a 20% reduction in municipal energy use. Details and documentation for projected energy savings appear in Table 4 (below and Appendix B) and Appendix A.

Buildings

Buildings account for approximately 70% of the municipality's energy use. Additional measures to decrease energy use in buildings and allow the Town to achieve its 20% reduction will:

- Utilize MassEnergyInsight to support ongoing work to identify and improve the least energy efficient buildings;
- Identify energy-saving changes in occupant behavior and launch programs aimed at encouraging such changes.

Some of our schools, for example, maintain an average, indoor temperature of 70 degrees Fahrenheit year round. Lowering this temperature in the winter and raising it in the summer could save considerable energy. Decreasing the use of exterior lighting overnight is another way to reduce energy use. It will be important to ensure that energy conservation measures align with the needs of particular Town departments. Below is a general list of measures that could lower energy use through changes in occupant behavior:

- Identify computers that do not need to run all the time, and set up automatic standby/hibernate options so that the monitor, hard disk, and the system will be put into standby or hibernate mode at a set time;
- Encourage employees to have warmer clothes available so that the heating can be set at a lower level;
- Set cooling to the highest comfortable temperature;
- Establish guidelines for open-window air exchange;
- Audit and address unnecessary interior and exterior building lighting;
- Evaluate/implement energy efficient cooling strategies for IT computer rooms;
- Turn off equipment not in use during evenings and summers at school buildings; and
- Seek creative ways to incentivize energy reduction at schools and find ways to make energy conservation part of the school curriculum.

During Years 1-3, Wellesley will convene stakeholders to design an occupant behavior energy program. This program will likely involve research and assessment of potential occupant-behavior-related energy savings in municipal buildings, and implementation of measures to encourage energy savings through occupant behavior. The occupant behavior program will engage Town departments and building occupants in a collaborative and transparent process that is sensitive to the needs and views of building users.

Water and Wastewater

Water and wastewater facilities often contribute a significant fraction of a local government's energy use because water and wastewater pumps, motors, and other equipment generally operate 24 hours per day and seven days per week (USEPA, 2013). Energy required for Wellesley's drinking water treatment and delivery and wastewater delivery constitute about 6% of the municipality's annual energy use. Wellesley's equipment for treatment and delivery includes several pumps, pump stations, boosters, and ejectors as listed in Table A-11 (see Appendix A). Drinking water equipment uses about 5% of the Town's annual energy budget in the form of electricity, while wastewater equipment uses just .5 to 1% of the annual energy budget.

Ways to reduce energy use in water and wastewater facilities include:

- Improve the energy efficiency of water and wastewater equipment and facility operations;
- Promote the efficient use of water;
- Capture the energy in wastewater to generate electricity and heat;
- Conserve water;
- Prevent water loss;
- Reduce storm water; and
- Repair sewer systems to prevent ground water infiltration.

For designing, implementing, and sustaining energy efficiency improvements in water and wastewater facilities, Wellesley will follow a program similar to that outlined in USEPA's *Energy Efficiency in Water and Wastewater Facilities: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs* (2013). In particular, Wellesley will conduct an audit of water and wastewater treatment facilities to:

- Identify activities, operations, and equipment that consume the most energy or are inefficient;
- Prioritize and make a plan for energy-related improvements;
- Implement improvements;
- Monitor and measure results; and
- Maintain the energy improvement program.

Pumps generally present excellent opportunities to reduce energy use. Variable frequency drives (VFDs) reduce pump speed, required horsepower and, in turn, energy use (Gmitro, 2009). Appendix A presents energy savings expected from VFDs.

Vehicles

In addition to the ECMs detailed above and in Table 4 and Appendix A, the Town of Wellesley will implement the Fuel Efficient Vehicle Policy, included in its Green Communities application, and will encourage the purchase of electric vehicles wherever practical.

Program Management Plan for Implementation, Monitoring, Oversight

The implementation of the Energy Reduction Plan will be the ultimate responsibility of the Board of Selectmen and individual departments who put in place specific ECMs. The Sustainable Energy Committee will serve as a coordinating body and will work with relevant Town entities to:

- Develop and implement programs regarding occupant behavior and anti-idling;
- Monitor municipal energy use in MEI;
- Submit the Town's annual report to DOER;
- Work with Town departments to prepare and submit Green Communities grant applications. The SEC will work with BOS and Town departments to identify projects for inclusion in these grant applications (based on associated cost, payback, and energy savings).

Monitoring - Wellesley will use MassEnergyInsight, in conjunction with FMD analyses, to track ongoing energy use and report on changes in energy use. The SEC and Town departments will monitor ECMs after implementation to ensure that they are providing expected energy reductions.

Oversight - The SEC will track progress toward goals and the status of project implementation, and will report results to the BOS and School Committee. The SEC will disseminate, to stakeholders, annual reports on both energy use and activities relevant to the ERP, and will submit these documents to the Department of Energy Resources' Green Communities program.

Energy Conservation Measures

A summary of energy savings projected for specific ECMs appears in Figure 8, below. Details about ECMs, their cost and their energy and cost savings appear in Table 4. The specific measures outlined in this ERP are subject to change, contingent on available funding, cost, technology, and the existence of alternative energy conservation measures.

Figure 8: Summary of Energy Savings					
ECM	Projected Energy Savings (Native Units)		Projected Energy Savings (MMBtu)	Percentage of Total FY15 Energy Use	Notes
Interior LEDs	1,610,280	KWh	5,494	4.1	Completed/Planned
Metasys and HVAC	68,810	therms	6,881	5.2	Completed
LED Streetlights	1,073,276	KWh	3,662	2.7	Planned
Streetlight Controls	122,039	KWh	416	0.31	Planned, but dependent on analysis of appropriate dimming scenarios
IdleRight	10,950	gallons	1,359	1.0	Pilot planned. Full implementation dependent on pilot results.
Vehicle Maintenance and possibly FuelMaster	5,720	gallons	709	0.53	Planned, but dependent on pilot results
Anti-Idle Policy	13,346	gallons	1,655	1.2	Planned
Total			23,587		
Percentage of Total Municipal Energy Use				15	

Table 4: Energy Conservation Measures Data

ECMs			Status		Energy Data			
Category/ Building Name	Energy Conserva tion Measure Name	ECM Type (select one from drop- down)	Status (select one from drop- down)	Status Date (Completed with month/year or planned Qtr/year)	Projected Annual Electricity Savings (kWh)	Projected Annual Natural Gas Savings (therms)	Projected Annual Propane Savings (gallons)	Projected Annual Gasoline Savings (gallons)
Bates	Metasys	HVAC	Completed	Feb-17		4,728		
Fiske	LEDs	Interior Lighting	Completed	Aug-15	118,746			
Fiske	Metasys	HVAC	Completed	Aug-15	-	3,894		
FS - Central	Metasys	HVAC	Completed	Jun-16	-	499		
FS - Central	ReCx	HVAC	Completed	Jun-16	-	499		
FS - Main	Metasys	HVAC	Completed	Feb-16	-	1,820		
FS - Main	ReCx	HVAC	Completed	Jul-17	-	1,820		
High School	Metasys	HVAC	Completed	Apr-16	-	7,128		
High School	ReCx	HVAC	Completed	Dec-16	-	7,128		
Library - Fells	Metasys	HVAC	Completed	Apr-16	-	81		
Library - Hills	Metasys	HVAC	Completed	Apr-16	-	302		
Library - Main	Metasys	HVAC	Completed	Apr-16	-	1,895		
Library - Main	ReCx	HVAC	Completed	Oct-16	-	1,895		
Middle School	Metasys	HVAC	Completed	Apr-16	-	16,586		

Middle School	Windows/Weatherization	HVAC	Completed	Aug-16		8,293		
PAWS	Metasys	HVAC	Completed	Apr-16	-	433		
Police	Metasys	HVAC	Completed	Feb-16	-	674		
Police	ReCx	HVAC	Completed	Jul-17	-	674		
Schofield	LEDs	Interior Lighting	Completed	Aug-15	73,062	-		
Schofield	Metasys	HVAC	Completed	Aug-15	-	3,048		
Sprague	Metasys	HVAC	Completed	May-16	-	3,678		
Town Hall	ReCx	HVAC	Completed	Jul-16	-	1,309		
Warren	Metasys	HVAC	Completed	Feb-17	-	1,211		
Warren	ReCx	HVAC	Completed	Mar-17	-	1,211		
Bates	LEDs	Interior Lighting	Planned	FY17, 19, & 20	88,598	-		
FS - Central	LEDs	Interior Lighting	Planned	FY17 & 19	10,497	-		
FS - Main	LEDs	Interior Lighting	Planned	FY17, 19, & 20	37,455	-		
High School	LEDs	Interior Lighting	Planned	FY20	470,435	-		
Library - Fells	LEDs	Interior Lighting	Planned	FY19	3,144	-		
Library - Hills	LEDs	Interior Lighting	Planned	FY19	11,757	-		
Library - Main	LEDs	Interior Lighting	Planned	FY17, 18, & 19	141,446	-		
Middle School	LEDs	Interior Lighting	Planned	FY18 & 19	384,119	-		
PAWS	LEDs	Interior Lighting	Planned	FY17	15,237	-		
Police	LEDs	Interior Lighting	Planned	FY20	35,607	-		
Sprague	LEDs	Interior Lighting	Planned	FY17 & FY19	122,105	-		

Town Hall	LEDs	Interior Lighting	Planned	FY17	54,150	-		
Warren	LEDs	Interior Lighting	Planned	FY17 & FY20	43,923	-		
Building Sub-total					1,610,280	68,806		
Street Lights	LEDs	Exterior Lighting	Planned	Q2 FY18	1,073,276	-		
Street Lights	Wireless Controls	Exterior Lighting	Planned	Q2 2020	122,039	-		
Light Sub-total					1,195,315			
DPW	Water/WW Equip							
Water Sub-total								
IdleRight	Vehicles	25 Police Cruisers	Planned	Q2 2020				10,950
Vehicle Maintenance	Vehicles	Fleet	Planned	Q2 2020				5,720
Anti-Idle Policy	Vehicles	Non-police & con	Planned	Q4 2018				13,346
Vehicle Sub-total								30,016
Projected Savings					2,805,595	68,806		30,016
TOTAL MMBtu SAVINGS			20,175		9,573	6,881		3,722

ECMs			Financial Data					Reference Data	
Category/ Building Name	Energy Conserva tion Measure Name	ECM Type (select one from drop- down)	Projected Annual Cost Savings (\$)	Total Installed Cost (\$)	Green Communi ty Grant (\$)	Utility Incentive s (\$)	Net Cost (\$)	Funding Source(s) for Net Costs	Source for Projected Savings
Bates	Metasys	HVAC	\$5,990	\$86,961			\$86,961	TOW	See HVAC/Metasy s analysis in Appendix A
Fiske	LEDs	Interior Lighting	\$16,031	\$363,711			\$363,711	TOW	See lighting analysis in Appendix A
Fiske	Metasys	HVAC	\$4,933	\$42,781			\$42,781	TOW	See HVAC/Metasy s analysis in Appendix A
FS - Central	Metasys	HVAC	\$633	\$34,131			\$34,131	TOW	See HVAC/Metasy s analysis in Appendix A
FS - Central	ReCx	HVAC	\$633	\$2,408			\$2,408	TOW	See HVAC/Metasy s analysis in Appendix A
FS - Main	Metasys	HVAC	\$2,306	\$18,581			\$18,581	TOW	See lighting analysis in Appendix A
FS - Main	ReCx	HVAC	\$2,306	\$8,643			\$8,643	TOW	See HVAC/Metasy s analysis in Appendix A
High School	Metasys	HVAC	\$9,031	\$32,431			\$32,431	TOW	See HVAC/Metasy s analysis in Appendix A
High School	ReCx	HVAC	\$9,031	\$35,249			\$35,249	TOW	See HVAC/Metasy s analysis in Appendix A
Library - Fells	Metasys	HVAC	\$103	\$19,431			\$19,431	TOW	See HVAC/Metasy s analysis in Appendix A
Library - Hills	Metasys	HVAC	\$383	\$22,431			\$22,431	TOW	See HVAC/Metasy s analysis in Appendix A
Library - Main	Metasys	HVAC	\$2,401	\$27,431			\$27,431	TOW	See HVAC/Metasy s analysis in Appendix A

Library - Main	ReCx	HVAC	\$2,401	\$9,168			\$9,168	TOW	See HVAC/Metasys analysis in Appendix A
Middle School	Metasys	HVAC	\$21,014	\$37,431			\$37,431	TOW	See HVAC/Metasys analysis in Appendix A
Middle School	Windows/Weatherization	HVAC	\$10,956	\$3,828,000			\$3,828,000		
PAWS	Metasys	HVAC	\$548	\$22,431			\$22,431	TOW	See HVAC/Metasys analysis in Appendix A
Police	Metasys	HVAC	\$854	\$18,031			\$18,031	TOW	See HVAC/Metasys analysis in Appendix A
Police	ReCx	HVAC	\$854	\$3,839			\$3,839	TOW	See HVAC/Metasys analysis in Appendix A
Schofield	LEDs	Interior Lighting	\$9,863	\$223,783			\$223,783	TOW	See lighting analysis in Appendix A
Schofield	Metasys	HVAC	\$3,861	\$29,181			\$29,181	TOW	See HVAC/Metasys analysis in Appendix A
Sprague	Metasys	HVAC	\$4,660	\$34,431			\$34,431	TOW	See HVAC/Metasys analysis in Appendix A
Town Hall	ReCx	HVAC	\$1,658	\$6,325			\$6,325	TOW	See HVAC/Metasys analysis in Appendix A
Warren	Metasys	HVAC	\$1,534	\$69,093			\$69,093	TOW	See HVAC/Metasys analysis in Appendix A

Warren	ReCx	HVAC	\$1,534	\$5,860			\$5,860	TOW	See HVAC/Metasy s analysis in Appendix A
Bates	LEDs	Interior Lighting	\$11,961	\$352,000			\$352,000	TOW	See lighting analysis in Appendix A
FS - Central	LEDs	Interior Lighting	\$1,417	\$19,000			\$19,000	TOW	See lighting analysis in Appendix A
FS - Main	LEDs	Interior Lighting	\$5,056	\$70,000			\$70,000	TOW	See lighting analysis in Appendix A
High School	LEDs	Interior Lighting	\$63,509	\$2,300,000			\$2,300,000		See lighting analysis in Appendix A
Library - Fells	LEDs	Interior Lighting	\$424	\$10,000			\$10,000	TOW	See lighting analysis in Appendix A
Library - Hills	LEDs	Interior Lighting	\$1,587	\$20,000			\$20,000	TOW	See lighting analysis in Appendix A
Library - Main	LEDs	Interior Lighting	\$19,095	\$420,000			\$420,000	TOW	See lighting analysis in Appendix A
Middle School	LEDs	Interior Lighting	\$51,856	\$1,270,000			\$1,270,000	TOW	See lighting analysis in Appendix A
PAWS	LEDs	Interior Lighting	\$2,057	\$45,000			\$45,000	TOW	See lighting analysis in Appendix A
Police	LEDs	Interior Lighting	\$4,807	\$125,000			\$125,000	TOW	See lighting analysis in Appendix A
Sprague	LEDs	Interior Lighting	\$16,484	\$374,000			\$374,000	TOW	See lighting analysis in Appendix A
Town Hall	LEDs	Interior Lighting	\$7,310	\$22,000			\$22,000	TOW	See lighting analysis in Appendix A
Warren	LEDs	Interior Lighting	\$5,930	\$165,000			\$165,000	TOW	See lighting analysis in Appendix A
Building Sub-total			\$305,014	\$10,173,762			\$10,173,762		

Street Lights	LEDs	Exterior Lighting	\$144,892	\$898,700			\$898,700	DOER grant (\$281,000) and TOW	See Appendix A for street light analysis.
Street Lights	Wireless Controls	Exterior Lighting	\$16,475	\$320,000			\$320,000	TOW	See Appendix A for wireless control analysis.
Ext. Light Sub-total			\$161,368	\$1,218,700			\$ 1,218,700		
DPW	Water/WW Equip								
Water Sub-total									
IdleRight	Vehicles	25 Police Cruisers	\$27,375	\$4,000			\$4,000	TOW	See Appendix A for IdleRight calcs and refs.
Vehicle Maintenance	Vehicles	Fleet	\$14,300					TOW	See Appendix A for Vehicle Maintenance calcs and refs.
Anti-Idle Policy	Vehicles	Non-police & con	\$33,365					TOW	See Appendix A for Anti-Idle Policy calcs and refs.
Vehicle Sub-total			\$75,040	\$4,000			\$ 4,000		
TOTAL Projected Savings			\$541,421	\$11,396,462			\$11,396,462		

Long-term Energy Reduction Goals: Beyond 5 Years

As Wellesley moves beyond the five-year ERP period, it will be in the Town's best financial, environmental, and human health interests to minimize energy use wherever possible. Wellesley will strive to:

- Integrate energy efficiency and energy use reduction strategies, where practical, into future purchasing, planning, policymaking, and practices;
- Establish sustainable development guidelines that recommend the lowest possible energy use per square foot of new and renovated buildings;
- Establish a culture in which those who utilize Town buildings, vehicles, and other equipment do so in a conservative and efficient manner;
- Continuously update the fuel efficient vehicle policy to encourage the purchase of highly efficient vehicles;
- Establish a vehicle use policy that minimizes driving and idling time; and
- Encourage renewable energy use wherever practical.

Appendix A:
Methodologies and Calculations for Energy Reduction Projections

(please see separate document)

Appendix B:
Table 4: Energy Conservation Measures Data in an Excel Spreadsheet

(please see separate document)

Appendix C:
MMBtu Unit Conversion Chart

Fuel Energy Content of Common Fossil Fuels per DOE/EIA

BTU Content of Common Energy Units – (1 million Btu equals 1 MMBtu)

- 1 kilowatt hour of electricity = 0.003412 MMBtu
- 1 therm = 0.1 MMBtu
- 1 ccf (100 cubic foot) of natural gas = 0.1028 MMBtu (based on U.S. consumption, 2007)
- 1 gallon of heating oil = 0.139 MMBtu
- 1 gallon of propane = 0.091 MMBtu
- 1 cord of wood = 20 MMBtu
- 1 ton of wood pellets = 16.5 MMBtu
- 1 gallon of gasoline = 0.124 MMBtu (based on U.S. consumption, 2007)
- 1 gallon of E100 ethanol = 0.084 MMBtu
- 1 gallon of E85 ethanol = 0.095 MMBtu
- 1 gallon of diesel fuel = 0.139 MMBtu
- 1 gallon of B100 biodiesel = 0.129 MMBtu
- 1 gallon of B20 biodiesel = 0.136 MMBtu²
- 1 gallon of B10 biodiesel = 0.137 MMBtu⁹
- 1 gallon of B5 biodiesel = 0.138 MMBtu⁹
- 1 barrel of residual fuel oil = 6.287 MMBtu

² Calculated Values from those of diesel and B100 biodiesel

Appendix D: References

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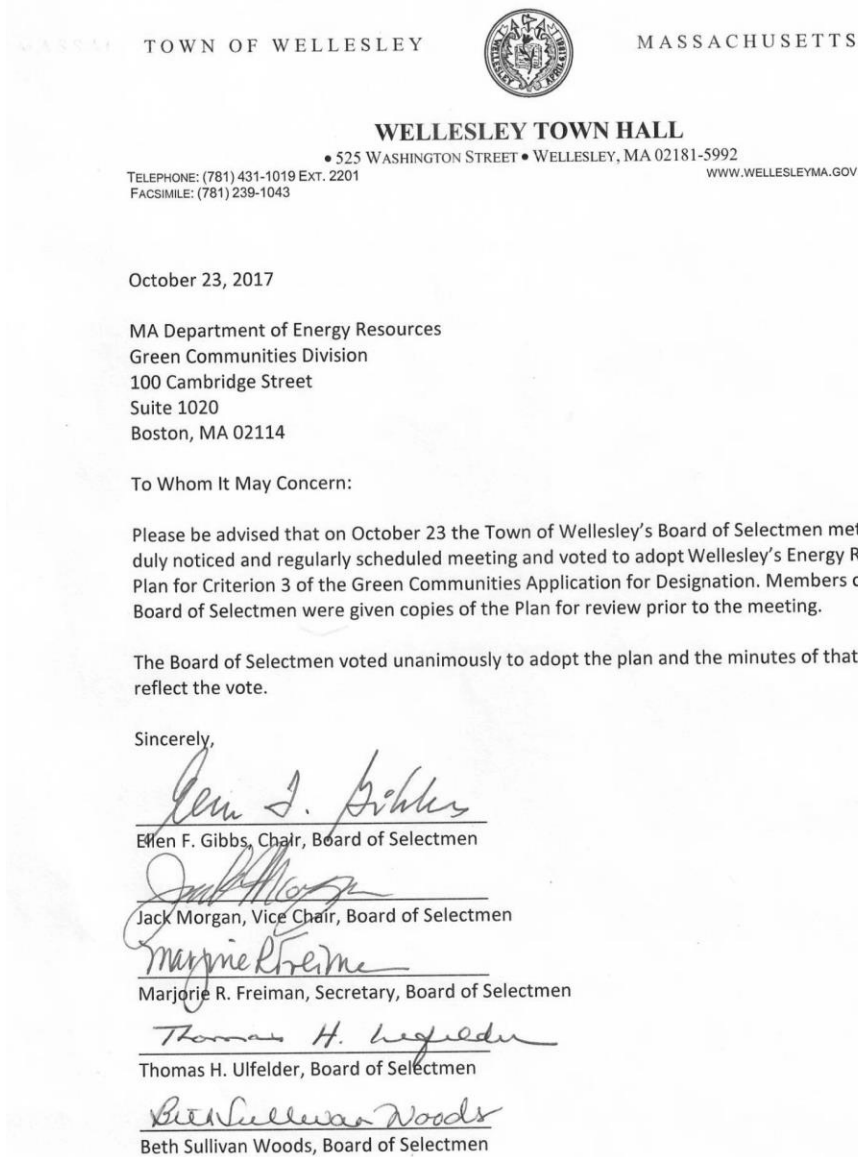
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Appendix E:
Authorizations and Endorsements of Wellesley's Energy Reduction Plan



WELLESLEY SCHOOL COMMITTEE

MICHAEL D'ORTENZIO JR., CHAIR
MATT KELLEY, VICE CHAIR
MELISSA MARTIN, SECRETARY



ANTHONY BENT, MEMBER
SHARON GRAY, MEMBER

40 Kingsbury Street • Wellesley • Massachusetts • 02481

October 17, 2017

Massachusetts Dept. of Energy Resources
Green Communities Division
100 Cambridge Street
Boston, MA 02114

Re: **Energy Reduction Plan**

Dear Sir or Madam:

Please be advised that the Wellesley Public School District adopts the Energy Reduction Plan as part of the Town's Green Communities Application for Designation. The Wellesley School Committee voted to approve the plan at its regularly scheduled meeting on October 10, 2017, and the meeting minutes reflect this vote. As Superintendent of Schools, I affirm my approval of the plan as well.

Regards,

A handwritten signature in black ink, appearing to read "Michael D'Ortenzio, Jr.".

Michael D'Ortenzio, Jr.
Chair

A handwritten signature in black ink, appearing to read "David F. Lussier".

David F. Lussier, Ed.D.
Superintendent